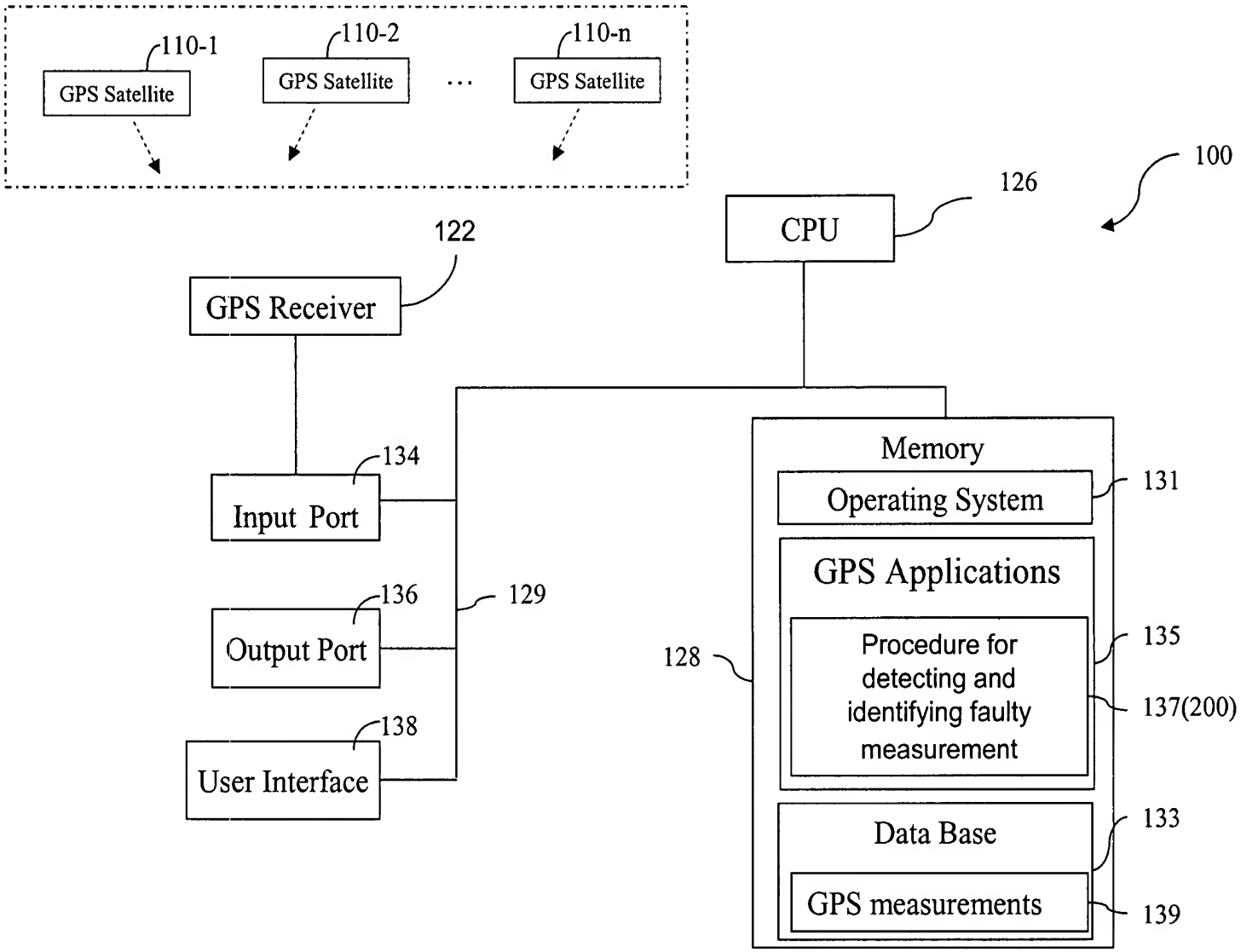
110-1
GPS Satellite
110-2
GPS Satellite
...
110-n
GPS Satellite
100
126
CPU
122
GPS Receiver
134
Input Port
136
Output Port
129
138
User Interface
Memory
Operating System
131
GPS Applications
128
Procedure for detecting and identifying faulty measurement
135
137(200)
Data Base
133
GPS measurements
139

FIGURE 1

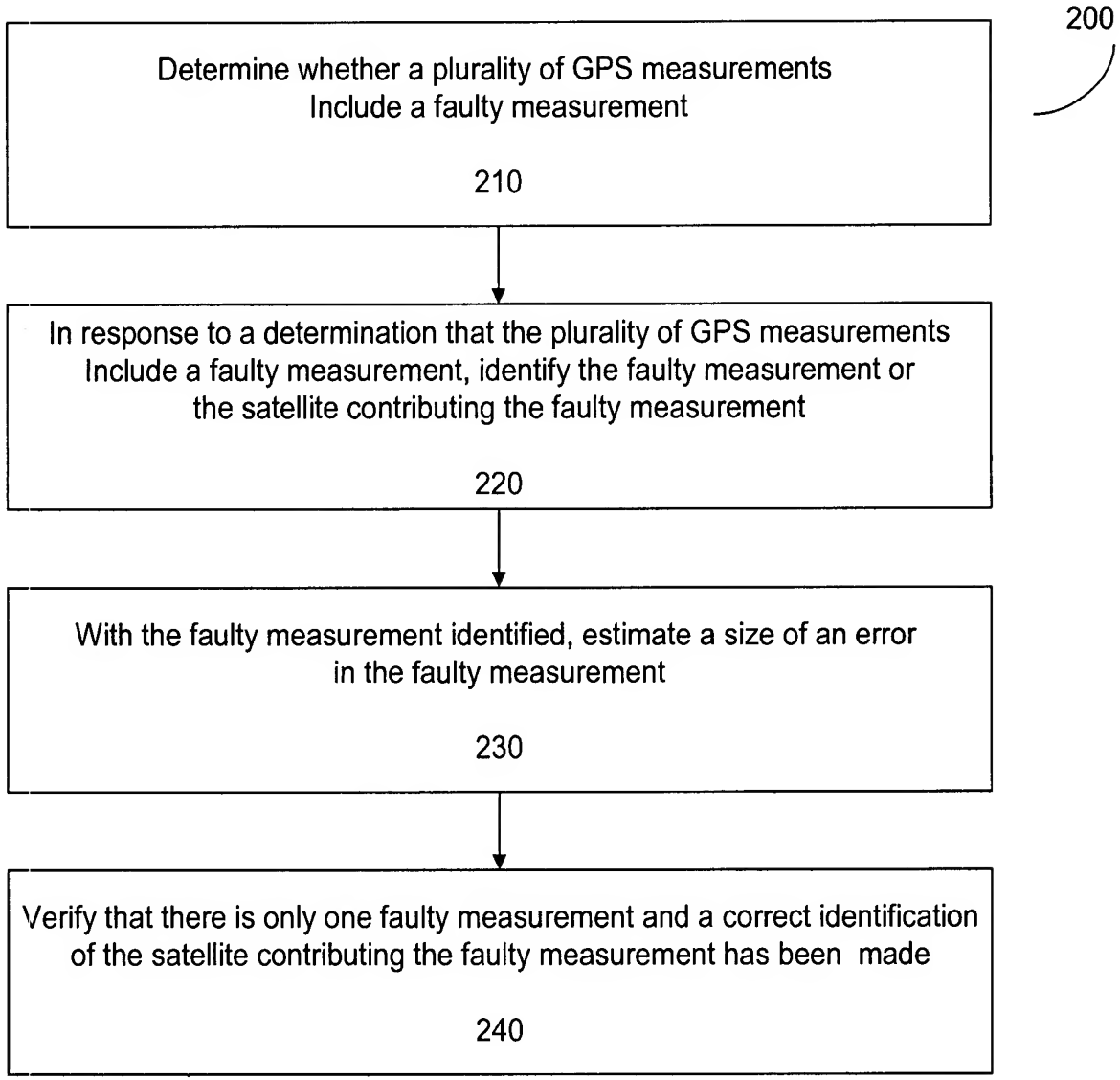
200
Determine whether a plurality of GPS measurements Include a faulty measurement
210
In response to a determination that the plurality of GPS measurements Include a faulty measurement, identify the faulty measurement or the satellite contributing the faulty measurement
220
With the faulty measurement identified, estimate a size of an error in the faulty measurement
230
Verify that there is only one faulty measurement and a correct identification of the satellite contributing the faulty measurement has been made
240

FIGURE 2

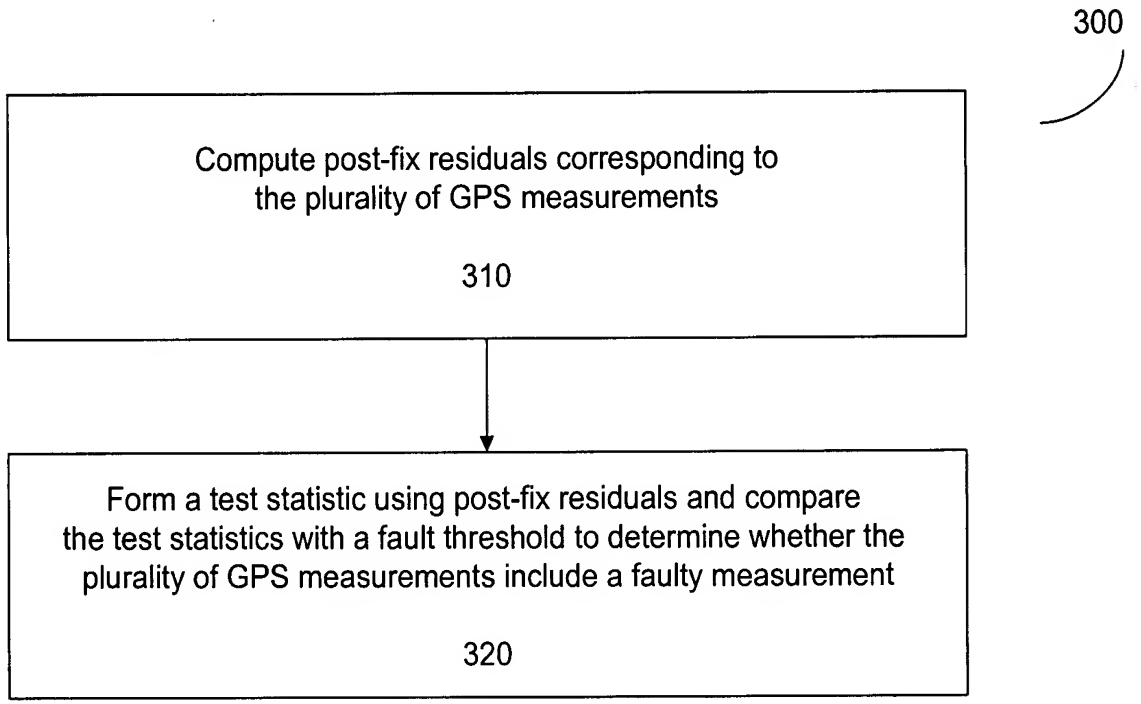
300
Compute post-fix residuals corresponding to the plurality of GPS measurements
310
Form a test statistic using post-fix residuals and compare the test statistics with a fault threshold to determine whether the plurality of GPS measurements include a faulty measurement
320

FIGURE 3

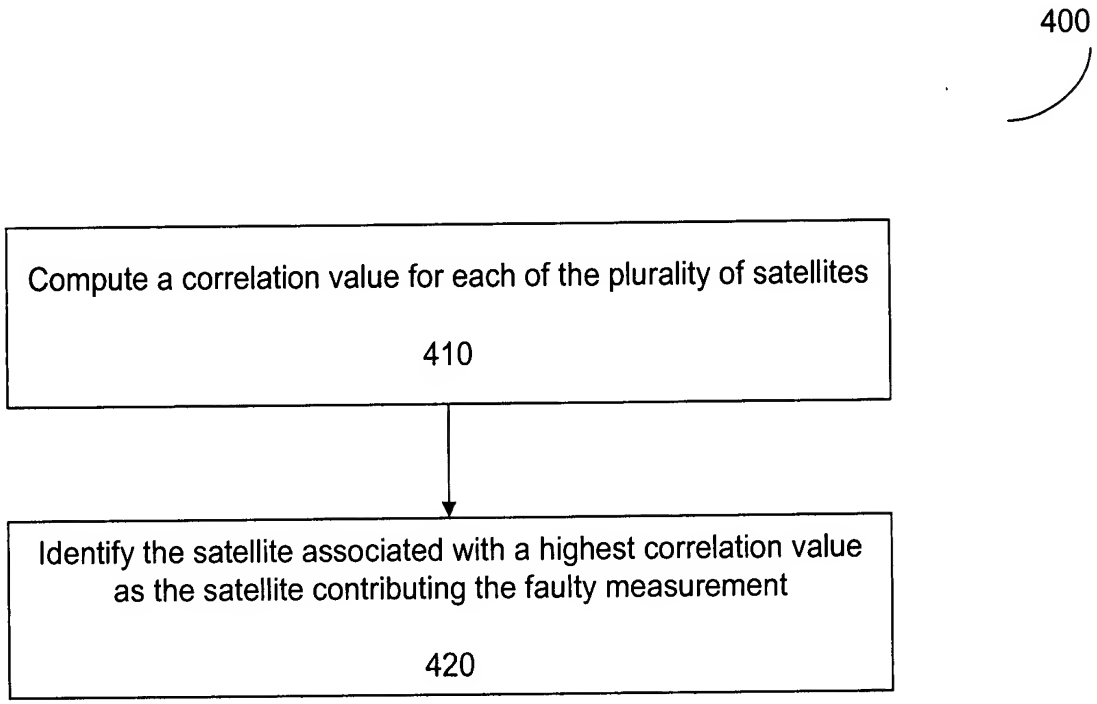
400
Compute a correlation value for each of the plurality of satellites
410
Identify the satellite associated with a highest correlation value as the satellite contributing the faulty measurement
420

FIGURE 4

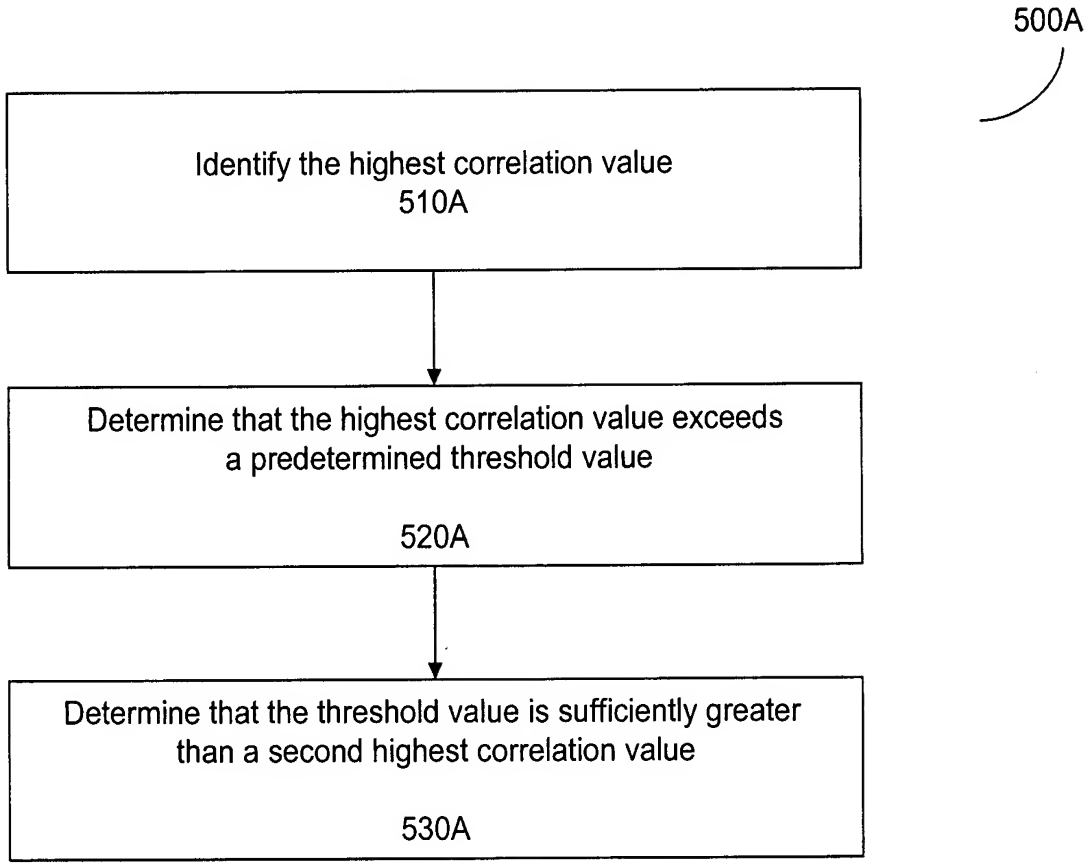
500A
Identify the highest correlation value
510A
Determine that the highest correlation value exceeds
a predetermined threshold value
520A
Determine that the threshold value is sufficiently greater
than a second highest correlation value
530A

FIGURE 5A

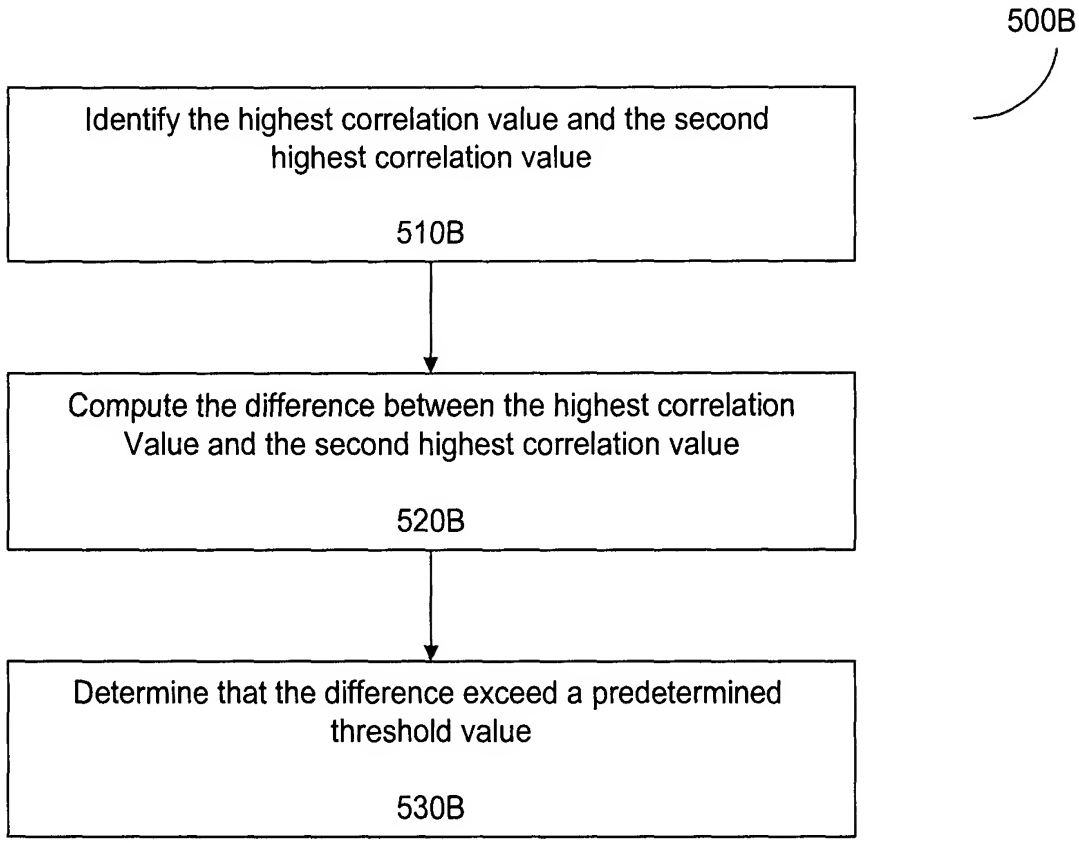
500B
Identify the highest correlation value and the second highest correlation value
510B
Compute the difference between the highest correlation Value and the second highest correlation value
520B
Determine that the difference exceed a predetermined threshold value
530B

FIGURE 5B

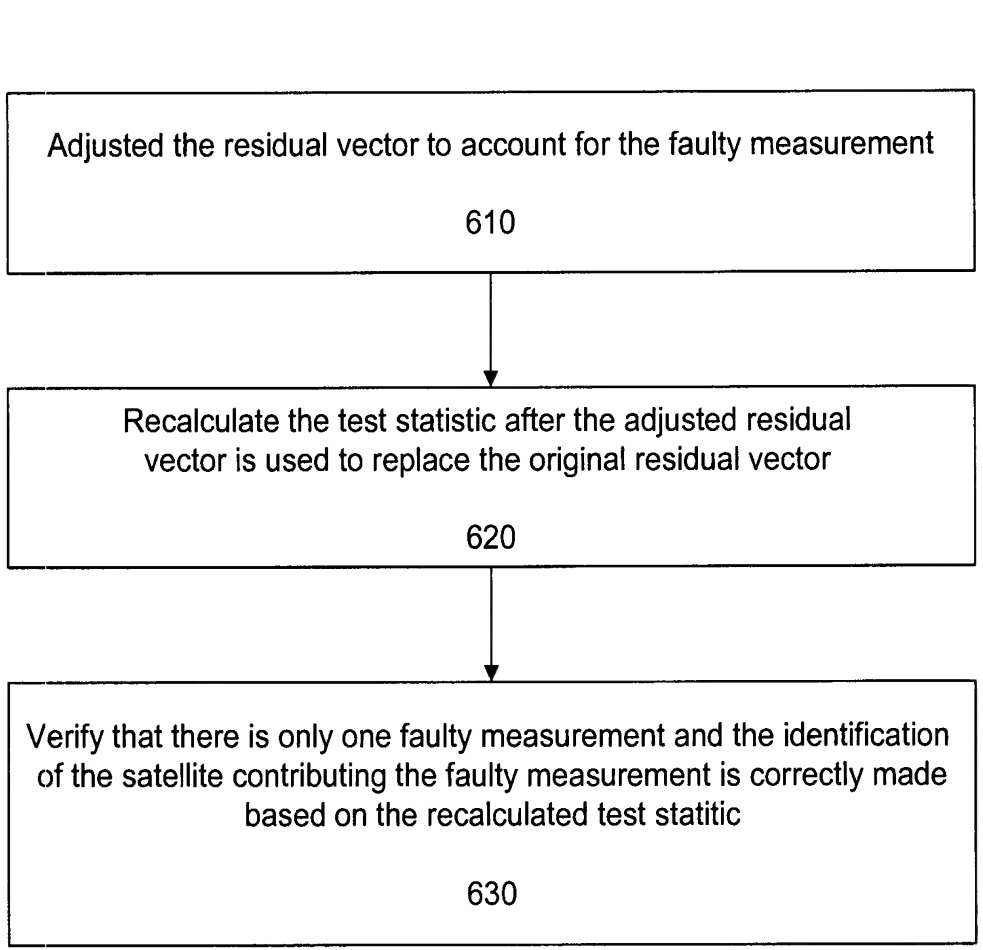
600
Adjusted the residual vector to account for the faulty measurement
610
Recalculate the test statistic after the adjusted residual vector is used to replace the original residual vector
620
Verify that there is only one faulty measurement and the identification of the satellite contributing the faulty measurement is correctly made based on the recalculated test statitic
630

FIGURE 6